Trend Study 16C-25-04

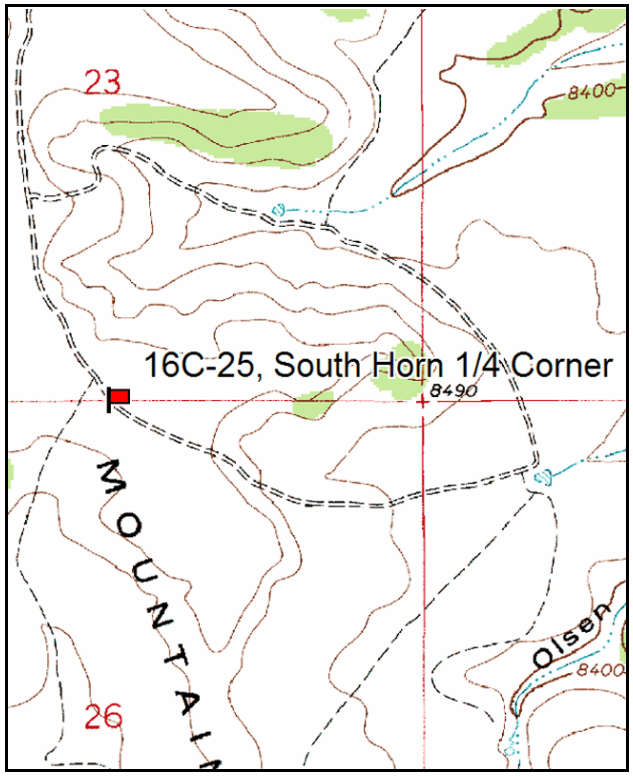
Study site name: South Horn 1/4 Corner . Vegetation type: Mountain Big Sagebrush .

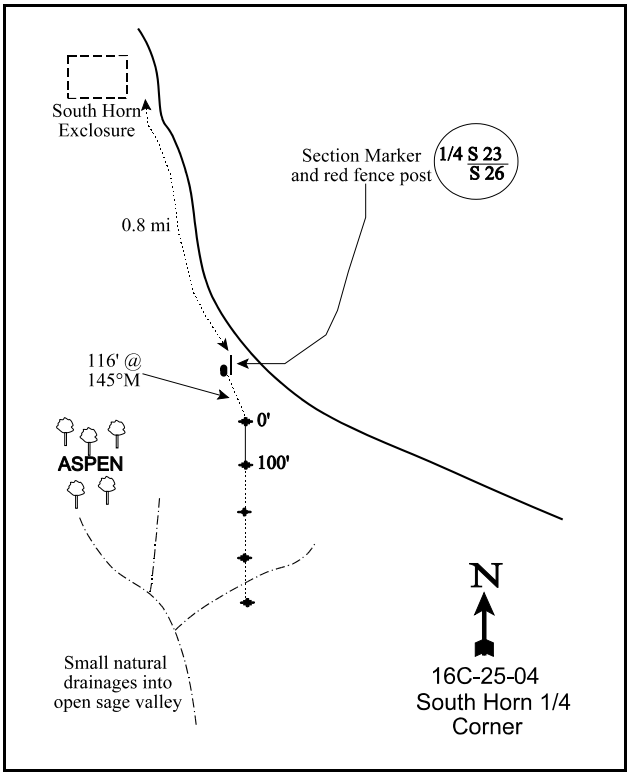
Compass bearing: frequency baseline 180 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From the South Horn exclosure (by study #16C-24), continue south on the main USGS road for 0.8 miles to a USGS landline marker by a tall red fencepost on the right side of the road. This is the witness post for the transect. From the witness post walk SE (145°M) for 116 feet to the 0-foot end of the baseline. The 18" green fencepost is marked by browse tag #9011.





Map Name: The Cap

Diagrammatic Sketch

Township l9S , Range 6E , Section 26

GPS: NAD 27, UTM 12S 4332839 N, 481397 E

DISCUSSION

South Horn 1/4 Corner - Trend Study No. 16C-25

The South Horn 1/4 Corner trend study samples an area of mountain big sagebrush/grass which is representative of a large expanse of open sagebrush slopes and flats on South Horn Mountain. On top of this large open plateau, the country is flat or gently rolling. The study is located on a southwest-facing slope (5%) with an elevation of 8,550 feet. The rocky ridges and barren rock outcrops support black sagebrush due to the shallow soils. Down the slope, mountain big sagebrush is dominate on the deeper soils. Elk utilize this area in winter and into early spring. Scattered clumps of pinyon-juniper and Utah serviceberry offer cover and forage, with a stand of aspen 300 yards to the west. The Forest Service permits for summer cattle grazing as part of the Horn Mountain allotment. On this particular site, there is little sign of cattle because there is little water available in the summer. Pellet group data from 1999 estimate 9 deer, 71 elk, and 3 cow days use/acre (22 ddu/ha, 175 edu/ha, 7 cdu/ha). All of the cow pats were old. Deer and elk pellet groups appeared to be from the previous winter. Pellet group data from 2004 estimate 5 deer, 84 elk, and 9 cow days use/acre (12 ddu/ha, 207 edu/ha, and 21 cdu/ha). Deer and elk use appears to be from the previous winter. Cows were on the site in 2004 when it was sampled.

The soil is relatively shallow with an estimated effective rooting depth of just over 12 inches. At that depth there is a clay/sand hardpan layer that could restrict root development. Soil texture is a sandy loam with a neutral pH (6.8). Parent material is sandstone. Phosphorus is limited at just 2.5 ppm. Values less than 10 ppm can limit normal plant growth and development. There is some evidence of localized soil movement, although there are no active gullies and herbaceous vegetation cover is abundant.

The dominant browse species is mountain big sagebrush, although this may be a marginal site for it. There is also a few black sagebrush mixed in. There were an estimated 10,132 mountain big sagebrush plants/acre reported in 1988. In 1994, the baseline was lengthened to provide a much larger sample. This larger sample is largely responsible for the differences in population densities between 1988 and 1994. The density of mountain big sagebrush was estimated at 4,140 plants/acre in 1994, 4,840 plants/acre in 1999, and has decreased to 2,820 plants/acre by 2004. The mountain big sagebrush is heavily hedged, especially near the top of the slope. However, this is where site potential would also be at its lowest. Vigor was poor and percent decadence was its highest in 1994 at 54%. Conditions improved in 1999 to 13%, but increased again in 2004 to 28%. Vigor is fairly good, although recruitment of young plants is not adequate to compensate for the 45% of decadent plants that were classified as dying.

Dwarf rabbitbrush is an abundant, predominately mature, population that shows light use. Smaller shrubs and half-shrubs like prickly phlox and low rabbitbrush are fairly common but are seldom utilized as forage. A few Utah serviceberry, were sampled and displayed only light hedging and good vigor. Other species on the site include Pediocactus, snowberry, fringed sagebrush, broom snakeweed, and gray horsebrush. All are present in low densities and do not provide much cover or forage.

The herbaceous understory is moderately abundant and diverse. Needle-and-thread, mutton and sandberg bluegrass are the most common species. Needle-and-thread increased significantly in 2004, while both mutton and sandberg have decreased significantly in nest frequency. Other species on the site include bottlebrush squirreltail, western wheatgrass, and Indian ricegrass. The forb population is exceptionally diverse. Twenty five species were identified in 1994, 27 in 1999 and 31 in 2004. The most common species include tapertip hawksbeard, hairy golden aster, penstemon, and desert phlox.

1994 TREND ASSESSMENT

Bare ground has remained about the same since 1988, while litter cover has decreased. However, soil trend is

still considered stable. The mountain big sagebrush population has greatly decreased since 1988, but most of the change is due to the lengthening of the baseline to get a more representative sample for browse species. Fifty seven percent of the population is now decadent which is an increase from 44% in 1988. More of the plants have been heavily hedged and show reduced vigor. The black sagebrush population also has a high percent of decadent plants at 45%, but provides only about 18% of the browse cover. Trend for browse is slightly down. Summed nested frequency for grasses and forbs combined has decreased greatly since 1988. Most of the decrease is from the forb composition while grasses actually increased slightly. Herbaceous understory trend is down for forbs but stable for grasses. The Desirable Components Index (see methods) rated this site as poor with a score of 44 due to an low shrub cover, high decadence, and moderate grass and forb cover.

TREND ASSESSMENT
soil - stable (3)
browse - slightly down (2)
herbaceous understory - down slightly (2)
winter range condition (DC Index) - 44 (poor) Mountain big sagebrush type

1999 TREND ASSESSMENT

Trend for soil continues to be stable. Percent cover for bare ground has declined, although litter cover is also down compared to 1994 estimates. Relative total vegetative cover has increased from 25% to 33%. Trend for the key browse species, mountain big sagebrush, slightly up. Use is heavier, yet vigor and recruitment have improved, and percent decadence has declined from 58% to 13%. Trend for the herbaceous understory is down slightly for grasses and stable for forbs. Cover for grasses and forbs have increased nearly two-fold compared to 1994. The most abundant grass, mutton bluegrass, has remained stable, but Sandberg bluegrass declined significantly in frequency. Overall, the herbaceous trend is considered stable. The Desirable Components Index rated this site as good with a score of 70 due to an increase in shrub cover, decrease decadence, and an increase in grass and forb cover.

TREND ASSESSMENT
soil - stable (3)
browse - slightly up (4)
herbaceous understory - stable (3)
winter range condition (DC Index) - 70 (good) Mountain big sagebrush type

2004 TREND ASSESSMENT

Trend for soil continues to be stable. Percent cover for bare ground and litter have increased slightly, while relative vegetation cover has decreased slightly from 33% in 1999 to 28%. Trend for key browse is down. The mountain big sagebrush density decreased from 4,840 plants/acre in 1999 to 2,820 plants/acre in 2004, a 42% drop in the population. Recruitment is low, percent decadency increased from 13% in 1999 to 28% in 2004, and the young age class is not compensating for the amount of decadent plants that are dying. Utilization has decreased slightly and shows reduced vigor. Density of broom snakeweed increased from 740 plants/acre in 1999 to 2,220 plants/acre in 2004. Trend for herbaceous understory is slightly down. Nested frequency decreased significantly for Mutton and Sandberg grass, but needle-and-thread has increased significantly, yet not to the level it was in 1988. Overall perennial grasses have gone down slightly. Perennial forbs decreased substantially from 1999 values. Annual forbs were almost nonexistent in 1994 and 1999, but increased in 2004. Forbs continue to be very diverse, but percent cover decreased from 36% in 1999 to just under 21% in 2004. The Desirable Components Index rated this site as fair with a score of 58 due to an increase in decadence, decrease in young shrubs, and a small decrease in grass cover.

TREND ASSESSMENT
soil - stable (3)
browse - down (1)
herbaceous understory - slightly down (2)
winter range condition (DC Index) - 58 (fair) Mountain big sagebrush type

HERBACEOUS TRENDS --
Management unit 16C, Study no: 25

Type	Species	Nested Frequency				Average Cover %		
		'88	'94	'99	'04	'94	'99	'04
G	Agropyron smithii	a-	a-	a5	b39	-	.03	.34
G	Agropyron spicatum	-	-	-	7	-	-	.16
G	Bouteloua gracilis	9	26	15	12	.39	.40	.15
G	Carex spp.	a-	a-	b14	a-	-	.42	-
G	Elymus salina	19	8	25	14	.33	.47	.10
G	Koeleria cristata	b91	b66	a37	a17	.42	.95	.10
G	Oryzopsis hymenoides	-	2	3	9	.00	.15	.16
G	Poa fendleriana	c254	b192	b190	a113	3.29	6.55	1.98
G	Poa secunda	a64	d200	c131	b94	1.75	1.45	2.10
G	Sitanion hystrix	52	44	51	52	.22	.64	.51
G	Stipa comata	b143	b118	a53	b134	2.07	.96	4.63
Total for Annual Grasses		0	0	0	0	0	0	0
Total for Perennial Grasses		632	656	524	491	8.49	12.04	10.27
Total for Grasses		632	656	524	491	8.49	12.04	10.27
F	Allium spp.	b14	a-	a-	a-	-	-	.00
F	Antennaria rosea	4	-	-	3	-	-	.00
F	Arabis spp.	b73	a12	a18	a18	.03	.04	.05
F	Astragalus convallarius	-	5	6	7	.15	.18	.01
F	Aster spp.	a1	a-	a-	b19	-	-	.19
F	Astragalus spp.	1	4	4	-	.03	.03	-
F	Castilleja chromosa	c183	b36	a-	a-	.15	-	-
F	Castilleja linariaefolia	a3	a6	b22	a2	.02	.62	.03
F	Chenopodium spp. (a)	-	-	-	6	-	-	.01
F	Cirsium calcareum	-	-	1	-	-	.03	-
F	Collomia linearis (a)	-	a-	a-	b126	-	-	.44
F	Crepis acuminata	b169	a55	a64	a66	.30	2.25	1.12
F	Cryptantha spp.	b51	a7	a1	a22	.04	.00	.20
F	Delphinium nuttallianum	b14	b9	a-	a-	.02	-	-
F	Draba spp. (a)	-	3	-	-	.00	-	-
F	Eriogonum alatum	a-	b15	b17	b17	.06	.18	.32

Type	Species	Nested Frequency				Average Cover %		
		'88	'94	'99	'04	'94	'99	'04
F	Erigeron eatonii	$_{b}$113	$_{b}$113	$_{b}$125	$_{a}$32	.80	1.80	.17
F	Erigeron pumilus	$_{a}$16	$_{b}$48	$_{a}$10	$_{a}$12	.18	.07	.06
F	Eriogonum racemosum	$_{a}$19	$_{b}$42	$_{ab}$33	$_{ab}$28	.19	.76	.45
F	Eriogonum umbellatum	$_{b}$166	$_{a}$15	$_{a}$28	$_{a}$11	.35	.61	.42
F	Gilia spp. (a)	-	6	3	-	.01	.03	-
F	Heterotheca villosa	$_{a}$-	$_{a}$3	$_{b}$36	$_{b}$29	.15	1.74	.81
F	Lappula occidentalis (a)	-	-	-	4	-	-	.01
F	Linum lewisii	1	-	-	-	-	-	-
F	Lithospermum ruderale	8	1	2	3	.00	.00	.03
F	Lupinus spp.	-	-	-	2	-	-	.00
F	Lygodesmia spp.	-	-	-	5	-	-	.06
F	Machaeranthera canescens	-	-	-	-	-	-	.03
F	Machaeranthera grindelioides	$_{b}$22	$_{b}$26	$_{b}$11	$_{a}$-	.09	.40	-
F	Oxytropis lambertii	-	-	-	1	-	-	.00
F	Penstemon comarrhenus	$_{a}$-	$_{a}$-	$_{b}$58	$_{b}$33	-	1.83	.32
F	Penstemon humilis	$_{b}$36	$_{b}$37	$_{a}$4	$_{a}$14	.66	.15	.39
F	Phlox austromontana	$_{c}$121	$_{ab}$74	$_{bc}$99	$_{a}$61	1.49	2.34	.93
F	Phlox longifolia	-	1	-	-	.00	-	-
F	Polygonum douglasii (a)	-	$_{a}$12	$_{a}$6	$_{b}$115	.05	.01	.32
F	Potentilla gracilis	-	-	7	1	-	.06	.03
F	Schoencrambe linifolia	-	-	3	-	-	.03	-
F	Senecio integerrimus	-	6	8	3	.04	.04	.03
F	Senecio multilobatus	$_{b}$23	$_{ab}$15	$_{ab}$12	$_{a}$7	.03	.03	.05
F	Townsendia spp.	2	-	-	-	-	-	-
F	Trifolium spp.	$_{c}$75	$_{ab}$21	$_{a}$5	$_{b}$36	.09	.01	.09
F	Zigadenus paniculatus	$_{b}$15	$_{a}$-	$_{a}$1	$_{a}$3	-	.00	.01
Total for Annual Forbs		0	21	9	251	0.07	0.04	0.78
Total for Perennial Forbs		1130	551	575	435	4.94	13.27	5.86
Total for Forbs		1130	572	584	686	5.01	13.31	6.65

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Management unit 16C, Study no: 25

Type	Species	Strip Frequency			Average Cover %		
		'94	'99	'04	'94	'99	'04
B	Amelanchier utahensis	5	2	0	1.18	-	-
B	Artemisia frigida	1	2	2	-	-	.03
B	Artemisia nova	0	2	5	-	.30	-
B	Artemisia tridentata vaseyana	84	77	66	7.41	8.27	8.61
B	Ceratoides lanata	0	3	1	-	-	-
B	Chrysothamnus depressus	50	49	47	1.20	1.92	2.67
B	Chrysothamnus viscidiflorus viscidiflorus	31	28	25	.46	.60	1.05
B	Eriogonum corymbosum	170	-	-	.03	-	-
B	Gutierrezia sarothrae	18	15	43	.21	.19	1.81
B	Leptodactylon pungens	32	24	23	.51	.61	.42
B	Pediocactus simpsonii	1	1	0	.00	-	-
B	Symphoricarpos oreophilus	3	3	6	.15	-	.00
B	Tetradymia canescens	6	5	5	.03	.15	.18
Total for Browse		401	211	223	11.23	12.06	14.80

CANOPY COVER, LINE INTERCEPT --
Management unit 16C, Study no: 25

Species	Percent Cover '04
Artemisia frigida	.06
Artemisia nova	.68
Artemisia tridentata vaseyana	9.44
Chrysothamnus depressus	1.88
Chrysothamnus viscidiflorus viscidiflorus	1.21
Gutierrezia sarothrae	1.08
Leptodactylon pungens	.58
Symphoricarpos oreophilus	.36
Tetradymia canescens	.36

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 16C, Study no: 25

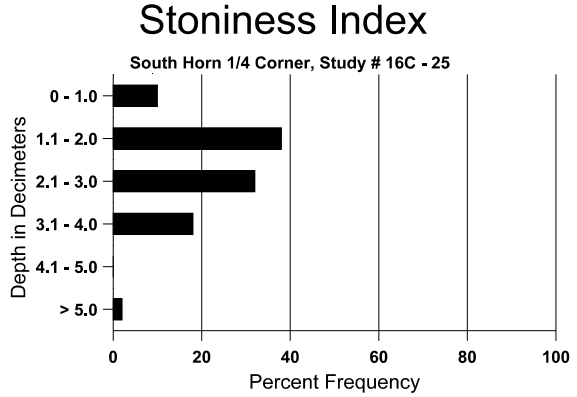
Species	Average leader growth (in) '04
Amelanchier utahensis	6.6
Artemisia tridentata vaseyana	2.0

BASIC COVER --
Management unit 16C, Study no: 25

Cover Type	Average Cover % '88	'94	'99	'04
Vegetation	12.50	25.56	32.70	31.19
Rock	.25	.42	3.50	2.20
Pavement	1.50	.37	1.58	3.03
Litter	44.25	33.93	24.04	32.25
Cryptogams	4.00	2.63	3.77	2.83
Bare Ground	37.50	38.25	33.43	41.58

SOIL ANALYSIS DATA --
Management unit 16C, Study no: 25, Study Name: South Horn 1/4 Corner

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	ds/m
12.5	50.7 (14.8)	6.8	57.4	28.7	13.8	1.3	2.5	115.2	0.5



PELLET GROUP DATA --
Management unit 16C, Study no: 25

Type	Quadrat Frequency		
	'94	'99	'04
Rabbit	23	14	4
Elk	38	34	48
Deer	6	19	4
Cattle	-	3	4

Days use per acre (ha)	
'99	'04
-	-
71 (175)	84 (207)
9 (22)	5 (12)
3 (7)	9 (22)

BROWSE CHARACTERISTICS --
Management unit 16C, Study no: 25

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Amelanchier utahensis												
88	**0**	-	-	-	-	-	0	0	-	-	0	-/-
94	**180**	-	-	180	-	-	11	0	-	-	0	27/36
99	**40**	-	-	40	-	-	50	50	-	-	0	36/45
04	**0**	-	-	-	-	-	0	0	-	-	0	34/50
Artemisia frigida												
88	**0**	133	-	-	-	-	0	0	-	-	0	-/-
94	**20**	-	-	20	-	-	0	0	-	-	0	5/7
99	**40**	-	-	40	-	-	0	0	-	-	0	9/9
04	**40**	-	-	40	-	-	50	0	-	-	0	7/12
Artemisia nova												
88	**0**	-	-	-	-	-	0	0	-	-	0	-/-
94	**0**	-	-	-	-	-	0	0	-	-	0	-/-
99	**40**	-	20	20	-	-	0	0	-	-	0	6/18
04	**200**	-	20	180	-	-	0	0	-	-	0	5/13
Artemisia tridentata vaseyana												
88	**10132**	133	3333	2266	4533	-	33	14	45	.98	10	10/13
94	**4180**	-	280	1660	2240	1120	22	20	54	36	36	12/22
99	**4840**	60	1000	3220	620	720	30	65	13	4	6	16/25
04	**2820**	2140	200	1820	800	800	50	21	28	13	13	19/31
Ceratoides lanata												
88	**0**	-	-	-	-	-	0	0	-	-	0	-/-
94	**0**	-	-	-	-	-	0	0	-	-	0	-/-
99	**100**	-	20	80	-	-	60	0	-	-	0	-/-
04	**40**	-	-	40	-	-	100	0	-	-	0	6/9

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Chrysothamnus depressus												
88	**4399**	133	1866	1600	933	-	21	15	21	-	8	3/5
94	**2500**	-	20	2440	40	-	11	2	2	-	0	3/7
99	**3060**	40	100	2920	40	20	5	0	1	-	0	3/8
04	**2500**	-	-	2260	240	140	10	8	10	2	2	4/9
Chrysothamnus viscidiflorus viscidiflorus												
88	**1666**	-	1266	400	-	-	12	20	-	-	0	6/6
94	**1200**	-	20	1180	-	-	15	0	-	-	0	5/8
99	**1260**	-	60	1200	-	-	0	0	-	-	0	6/9
04	**1040**	-	-	1040	-	-	0	0	-	-	0	8/13
Gutierrezia sarothrae												
88	**266**	-	133	133	-	-	0	0	0	-	0	3/4
94	**580**	-	-	580	-	-	0	0	0	-	0	4/6
99	**740**	-	100	640	-	20	0	0	0	-	0	5/7
04	**2220**	160	220	1980	20	-	0	5	1	-	7	6/10
Leptodactylon pungens												
88	**9599**	466	1733	7400	466	-	.69	0	5	.41	1	4/4
94	**1380**	-	20	1320	40	-	0	0	3	-	0	3/6
99	**1320**	20	120	1200	-	-	0	0	0	-	0	4/5
04	**880**	-	60	820	-	-	0	0	0	-	0	5/7
Pediocactus simpsonii												
88	**0**	-	-	-	-	-	0	0	-	-	0	-/-
94	**20**	-	-	20	-	-	0	0	-	-	0	1/2
99	**20**	-	-	20	-	-	0	0	-	-	0	-/-
04	**0**	-	-	-	-	-	0	0	-	-	0	1/3
Symphoricarpos oreophilus												
88	**0**	-	-	-	-	-	0	0	0	-	0	-/-
94	**80**	-	-	40	40	-	25	0	50	-	25	13/28
99	**80**	-	-	80	-	-	0	0	0	-	0	13/20
04	**160**	-	20	100	40	-	0	0	25	-	0	7/10
Tetradymia canescens												
88	**0**	-	-	-	-	-	0	0	0	-	0	-/-
94	**180**	-	40	140	-	-	22	0	0	-	0	4/6
99	**100**	-	20	80	-	20	40	0	0	-	0	6/8
04	**120**	-	20	80	20	-	17	17	17	17	17	6/10